3.2.3. SOLAR RADIATION CALIBRATION FACILITY

SRF Radiometric Standards Activity

Self-calibrating cavity radiometers (referred to as cavities) are the basic references for all CMDL broadband solar radiation measurements. Long-term performance of these sensors is checked and documented through regular comparisons with peer cavities from other private and public sector groups and agencies as well as other countries. Also, the CMDL reference cavities are periodically compared with the World Standard Group (WSG) radiometers that are kept at the World Radiation Center in Davos, Switzerland. NOAA has participated in these periodic comparisons since they began more than 30 years ago. These International Pyrheliometer Comparisons (IPCs) are sponsored by the World Meteorological Organization (WMO). The most recent intercomparison, IPC IX, was conducted at the World Radiation Center in Davos from September 25 to October 13, 2000. CMDL, as a WMO Region IV radiation center, participated in the comparison with three NOAA Solar Radiation Facility (SRF) cavities, TMI67502, AHF28553, and AWX32448. The SRF reference cavities were compared with the WSG radiometers, and ratios of measurements from these cavity radiometers to the World Radiation Reference (WRR) were established. The ratios for the three SRF references that participated in IPC IX are listed in Table 3.8. Results of recent annual comparisons of CMDL reference cavities with peer cavities at the National Renewable Energy Laboratory (NREL) in Golden, Colorado, are also listed. The NREL pyrheliometer comparisons (NPCs) provide an annual check of the NOAA references with NREL references.

TABLE 3.8. Ratios of Measurements from Three SRF Reference Cavity Radiometers to Measurements from WSG and Peer Radiometers, Obtained During Pyrheliometer Comparisons

Pyrheliometer Comparison	TMI 67502	AHF 28553	AWX 32448
IPC VIII (1995)	0.99869	0.99756	
NPC 1998		0.99783	
NPC 1999		0.99741	1.00086
IPC IX (2000)	0.99966	0.99733	1.00038
NPC 2001		0.99704	1.00073

SRF Special Projects

A self-calibrating cavity radiometer equipped with a calcium fluoride window was deployed at the CMDL BAO BSRN site in August 2000 and has operated continuously since installation. Additional installations at other CMDL BSRN sites are planned. Other special projects during the 2000-2001 period included a comparison of a CMDL reference radiometer with reference radiometers of the Australian Bureau of Meteorology during May 2000. The comparison was conducted at Alice Springs, Australia, after CMDL participation in the Biennial BSRN Meeting held in Melbourne, Australia, in early May 2000. SRF also completed specification and procurement of solar radiation monitoring hardware and sensors for a number of international projects during 2000-2001. These projects included ACE-Asia, BSRN sites (Algeria, South Africa, and Russia), and Global Atmospheric Watch (GAW) baseline sites (Algeria, Argentina, Brazil, and Indonesia). Support for various CMDL/STAR group field campaigns (albedo measurement, sunphotometry, ACE-Asia, and ARM) was also provided. A report of the SRF historical maintenance of radiometric references, characterization, and calibration of sensors used at CMDL monitoring sites was published in March 2000 [*Nelson*, 2000]. Collaboration was undertaken with other authors on publications investigating pyranometer zero-offset effects and utilization of broadband pyranometer data to model UV irradiances [e.g., *Dutton et al.*, 2001].